



*The*  
OHIO STATE UNIVERSITY  
BULLETIN

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VOLUME XXXIII

JANUARY 17, 1929

NUMBER 10

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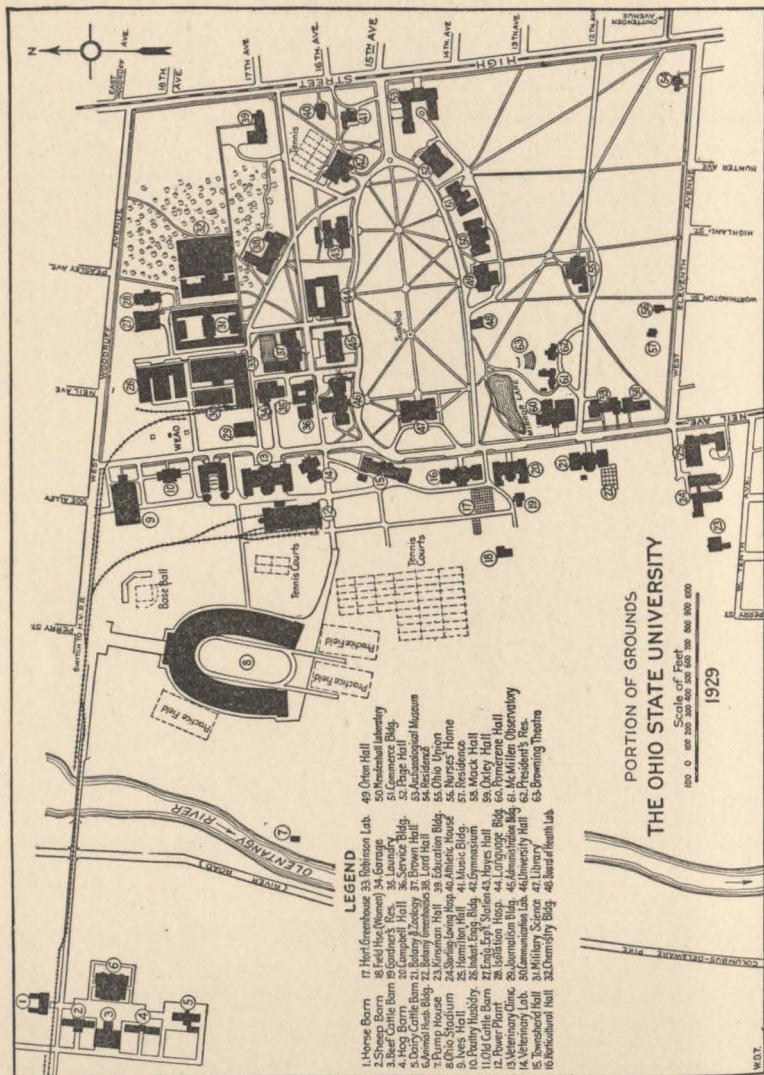
APPLIED OPTICS

1929 - 1930

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PUBLISHED BY THE UNIVERSITY AT COLUMBUS

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# PORTION OF GROUNDS THE OHIO STATE UNIVERSITY

Scale of Feet  
0 100 200 300 400 500 600 700 800 900 1000

1929

## APPLIED OPTICS

1929-1930

THE OHIO STATE UNIVERSITY  
COLUMBUS



## CALENDAR FOR 1929

JANUARY.							FEBRUARY.							MARCH.							APRIL.									
S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S			
				1	2	3						1	2							1					1	2	3	4	5	6
6	7	8	9	10	11	12	3	4	5	6	7	8	9	3	4	5	6	7	8	9	7	8	9	10	11	12	13	14	15	
13	14	15	16	17	18	19	10	11	12	13	14	15	16	10	11	12	13	14	15	16	14	15	16	17	18	19	20	21	22	
20	21	22	23	24	25	26	17	18	19	20	21	22	23	17	18	19	20	21	22	23	21	22	23	24	25	26	27	28	29	
27	28	29	30	31			24	25	26	27	28			24	25	26	27	28	29	30	28	29	30							
														31																
MAY.							JUNE.							JULY.							AUGUST.									
S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S			
				1	2	3						1				1	2	3	4	5	6							1	2	3
5	6	7	8	9	10	11	2	3	4	5	6	7	8	7	8	9	10	11	12	13	4	5	6	7	8	9	10	11	12	
12	13	14	15	16	17	18	9	10	11	12	13	14	15	14	15	16	17	18	19	20	11	12	13	14	15	16	17	18	19	
19	20	21	22	23	24	25	16	17	18	19	20	21	22	21	22	23	24	25	26	27	18	19	20	21	22	23	24	25	26	
26	27	28	29	30	31		23	24	25	26	27	28	29	28	29	30	31				25	26	27	28	29	30	31			
							30																							
SEPTEMBER.							OCTOBER.							NOVEMBER.							DECEMBER.									
S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S			
1	2	3	4	5	6	7				1	2	3	4	5						1	2	1	2	3	4	5	6	7		
8	9	10	11	12	13	14	6	7	8	9	10	11	12	3	4	5	6	7	8	9	8	9	10	11	12	13	14	15		
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22	23	24	25	26	27	28	20	21	22	23	24	25	26	17	18	19	20	21	22	23	22	23	24	25	26	27	28	29		
29	30						27	28	29	30	31			24	25	26	27	28	29	30	29	30	31							

## CALENDAR FOR 1930

[illegible]

# UNIVERSITY CALENDAR

1929

## SUMMER QUARTER

June 3 to 7	Entrance Examinations.
June 14 to 19	Physical Examinations for all new students.
June 17	Latest day for registration and payment of fees without penalty. (See page 16).
June 18	Classes begin, 7:30 A. M.
June 22	Intelligence Test for all new students (Saturday P. M.).
July 4	Independence Day.
July 22, 23, 24	Final Examinations, first term (at regular class hours)
July 19, 20	Physical Examinations for all new students.
July 24	First Term ends, 5:30 P. M.
July 25	Second Term begins, 7:30 A. M.
July 27	Intelligence Test for all new students (Saturday P. M.).
August 28, 29, 30	Final Examinations, second term (at regular class hours).
August 30	Summer Convocation (Commencement), 2:00 P. M.
August 30	Summer Quarter ends, 6:00 P. M.

## AUTUMN QUARTER

September 23 to 27	Entrance Examinations.
September 25 to 30	Freshman Week.
September 30	Physical Examinations for students other than Freshmen.
September 30	Latest day for registration and payment of fees without penalty. (See page 16).
October 1	Classes begin, 8:00 A. M.
October 5	Intelligence Test for all new students other than Freshmen (Saturday A. M.)
November 11	Armistice Day. No classes after 12 M.
November 28, 29, 30	Thanksgiving Recess.
December 18, 19, 20, 21	Final Examinations.
December 20	Autumn Convocation (Commencement), 2:00 P. M.
December 21	Autumn Quarter ends, 6:00 P. M.

1930

## WINTER QUARTER

January 2 to 4	Physical Examinations for all new students.
January 3	Latest day for registration and payment of fees without penalty. (See page 16).
January 6	Classes begin, 8:00 A. M.
January 4	Intelligence Test for all new students (Saturday A. M.).
February 22	University Day. No Classes.
March 12, 13, 14, 15	Final Examinations.
March 14	Winter Convocation (Commencement), 2:00 P. M.
March 15	Winter Quarter ends, 6:00 P. M.

## SPRING QUARTER

March 24 to 28	Physical Examinations for all new students.
March 24	Latest day for registration and payment of fees without penalty. (See page 16).
March 25	Classes begin, 8:00 A. M.
March 29	Intelligence Test for all new students (Saturday A. M.).
May 22	Competitive Drill. Cadet Regiments.
May 30	Memorial Day. No Classes.
June 4, 5, 6, 7	Final Examinations.
June 7	Alumni Day.
June 8	Baccalaureate Sermon.
June 9	Class Day.
June 9	Spring Convocation (Commencement), 6:30 P. M.
June 9	Spring Quarter ends.

## ADMINISTRATION

### BOARD OF TRUSTEES

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ALMA WACKER PATERSON, Vice-Chairman.....	Columbus
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### ADMINISTRATIVE OFFICERS

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Residence: Ohio State University Campus—UN-3148; Campus 274	
President Emeritus.....	WILLIAM OXLEY THOMPSON
Residence: 55 Woodland Ave.—FR-4000	
Secretary of the Board of Trustees and Business Manager.....	CARL E. STEEB
Office: Administration Building—UN-3148; Campus 332	
Residence: 198 W. Eleventh Ave.—UN-4732	
Assistant to the President.....	GEORGE W. ECKELBERRY
Office: Administration Building—UN-3148; Campus 380	
Residence: 1844 W. Third Ave.—RA-2819-W	
Registrar, University Editor, and Secretary of the University Faculty.....	EDITH D. COCKINS
Office: Administration Building—UN-3148; Campus 314	
Residence: 1580 Guilford Rd., Upper Arlington—UN-9635	
University Examiner.....	BLAND L. STRADLEY
Office: Administration Building—UN-3148; Campus 412	
Residence: Canal Winchester, Number 71	
Executive Clerk.....	KATHERINE A. VOGEL
Office: Administration Building—UN-3148; Campus 312	
Residence: 1040 Elmwood Ave.—UN-8784-J	
Comptroller.....	CHARLES A. KUNTZ
Office: Administration Building—UN-3148; Campus 332	
Residence: 265 Tulane Rd.—LA-3606	
Cashier.....	FLORIS D. HANE
Office: Administration Building—UN-3148; Campus 371	
Residence: 873 Thirteenth Ave.—WA-1054	
Student Counselor.....	JOSEPH A. PARK
Office: Administration Building—UN-3148; Campus 283	
Residence: 1474 Doone Rd.—UN-1559-J	
Dean of Women.....	ESTHER ALLEN GAW
Office: Pomerene Hall—UN-3148; Campus 480	
Residence: 51 N. Monroe Ave.—FR-1894	
House Superintendent, Residence Halls.....	EMMA McKINLEY PROUT
Office: Oxley Hall—UN-3148; Campus 346	
Residence: Mack Hall—UN-3148; Campus 264	

# APPLIED OPTICS

**Professor and Director.....MORGAN C. DAVIES**

Offices: 206 Mendenhall Laboratory—UN-3148; Campus 457

269 E. State St.—AD-8469

Residence: 1826 Guilford Rd.—UN-6603-W.

**Instructor.....CLARENCE R. ELLIS**

Residence: 2416 Pomeroy St.—UN-5995-R

## TEACHING STAFF

1928-1929

GEORGE W. RIGHTMIRE, M.A., LL.D. *President of the University*

MORGAN C. DAVIES, B.Sc. in App. Optics, M.D.

*Professor of Applied Optics and Director of the Department*

ALBERT MARTIN BLEILE, M.D.

*Professor of Physiology*

JOSEPH VILLIERS DENNEY, A.M., Litt.D.

*Professor of English*

ALPHEUS W. SMITH, A.M., Ph.D.

*Professor of Physics*

CHARLES BRADFIELD MORREY, B.A., M.D.

*Professor of Bacteriology*

FRANCIS LEROY LANDACRE, Ph.D.

*Professor of Anatomy*

HARRY WALDO KUHN, Ph.D.

*Professor of Mathematics*

WILLIAM LLOYD EVANS, M.Sc., Ph.D.

*Professor of Chemistry*

GEORGE FREDERICK ARPS, A.M., Ph.D.

*Professor of Psychology*

SAMUEL EUGENE RASOR, M.A., S.M.

*Professor of Mathematics*

ERNEST SCOTT, B.Sc. in Agr., M.D.

*Professor of Pathology*

RAYMOND C. OSBURN, M.Sc., Ph.D., *Professor of Zoology and Entomology*

ALBERT PAUL WEISS, A.M., Ph.D., *Professor of Experimental Psychology*

EDWIN LONG BECK, B.A.

*Professor of English*

CHARLES LINCOLN ARNOLD, M.Sc.

*Professor of Mathematics*

FREDERICK HARTZLER KRECKER, A.M., Ph.D.

*Professor of Zoology*

RAYMOND JESSE SEYMOUR, M.S., M.D.

*Professor of Physiology*

RALPH ALBERT KNOUFF, M.A., Ph.D.

*Associate Professor of Anatomy*

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ALFRED D. FROST, B.S., M.D. *Assistant Professor of Ophthalmology*

FRED ANDREWS HITCHCOCK, M.Sc., Ph.D.

*Assistant Professor of Physiology*

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*Instructor in Zoology and Entomology*

MARION D. POOL, Ph.D.

*Instructor in Physics*

HUGH E. SETTERFIELD, M.Sc.

*Instructor in Anatomy*

CLARENCE R. ELLIS, B.Sc. in App. Optics, D.Opt.Sc.

*Instructor in Applied Optics*

## CLINICAL ASSISTANTS

D. ORVAL KRANER, B.Sc. in App. Optics

JOHN W. SHERRARD, B.Sc.

## SUPERINTENDENT OF OPTICAL DISPENSARY

W. D. STEELE



# THE OHIO STATE UNIVERSITY

The Ohio State University is situated within the corporate limits of the city of Columbus. It is supported by appropriations from the State and Federal governments. The University land covers 1,118 acres, 300 of which are in the campus. The total value of land, buildings, and equipment is \$15,896,897.37.

The offices of the President of the University, the University Examiner, the Registrar, and the Bursar are located in the Administration Building.

## ORGANIZATION

For convenience of administration the departments of the University are grouped into organizations called Colleges. The Ohio State University comprises ten Colleges and a Graduate School, each under the administration of a Dean and College Faculty, as follows:

Graduate School	College of Education
College of Agriculture	College of Engineering
College of Liberal Arts	College of Law
College of Commerce and Administration, including the Schools of Journalism and Social Administration	College of Medicine, including the School of Nursing
College of Dentistry	College of Pharmacy
	College of Veterinary Medicine

## APPLIED OPTICS

The office of the Professor of Applied Optics is located in Mendenhall Laboratory on the University Campus, near the Fifteenth Avenue and High Street entrance.

This *Bulletin* is devoted exclusively to the work offered in Applied Optics for the academic year, 1929-1930

**NOTE:** Bulletins describing the work of the several Colleges may be obtained by addressing the University Examiner, Ohio State University, Columbus, and stating the College in which the writer is interested. (For list of bulletins, see cover page 3.)

# APPLIED OPTICS

## GENERAL INFORMATION

The Department of Applied Optics offers courses designed to prepare students to enter the field of optics. This field includes visual optics; a study of mirrors, lenses, lens design, lens calculation, and design of optical instruments; spectroscopy.

The courses in visual optics are outlined from the standpoint that the visual properties of the eye are intimately related to all branches of applied optics and also with the view of preparing students to detect and correct the errors of the eye by the use of lenses.

Provision is made for clinical practice in both the refractive and the pathological fields and for practice in the mechanical laboratory.

The courses in general science and mathematics form a basis for the study of theoretical optics and the application of optical principles.

## EQUIPMENT

The courses are thoroughly equipped with the modern and best forms of optical apparatus. The clinic is provided with schematic eyes with pathological slides, C. & I. ophthalmometer, Universal ophthalmometer, Hardy ophthalmometer with corneal microscope, several DeZeng phorometers, a Wolff skioptometer with batteries of spheres and cylinders, various pieces of muscle-testing apparatus, several self-luminous retinoscopes and ophthalmoscopes, a Geneva combined retinoscope and ophthalmoscope, a perimeter, a Rogers diotrometer, interpupillary gauge, vertex diotrometer, trial cases, Hertel keratometer, Stevens tropometer, Stevens clinoscope, and all the best forms of modern ophthalmic apparatus suitable for refractive and ophthalmic lens purposes. The mechanical laboratory is fully equipped to grind, surface, edge, and mount lenses.

## CLINICAL FACILITIES

The clinical laboratory has been enlarged and new equipment added during the present year.

Clinics are open to the students and members of the instructional force in particular and to outsiders upon application. They are conducted every afternoon during the week. These clinics furnish an endless variety of ocular conditions for the inspection and investigation of the students in these courses. Students make the examinations under the supervision of the director of the clinic. These clinics have served between five and six hundred persons each year during the period of their existence. Difficult cases form the basis for a subsequent discussion of methods of examination employed and the interpretation of the data obtained.

## STUDENT MEDICAL SERVICE

**Medical staff:** Dr. James S. Wilson, Director; Dr. M. F. Osborn, Dr. H. E. LeFever, Dr. Shirley Armstrong, Dr. Margaret Robertson.

**Office Hours:** When the University is in session, daily 8:30 to 12:30 and 1:00 to 4:30; Saturday, 8:30 to 12:30. Phone: Campus 461.

The object of the Student Medical Service is to render first aid and casual treatment to students on the campus. It also plans to conduct periodic health examinations for those who desire them.

**Free Treatment.** Consultation at the hours indicated above is free to any student. Two days hospital observation at the University Hospital is also free for those students who, in the judgment of the Student Medical Service, are in need of hospital service. Students requiring more than first aid or casual treatment will be referred to competent medical practitioners unless unable to pay for such services.

It may develop that students undergoing treatment at the Student Medical Service Office on the campus will need the services of a competent specialist. This will be arranged by the Student Medical Service on request of the student. The specialist is to be paid by the student.

**Treatment off the Campus.** For students who have recently entered the University, the following information is offered: In case of illness off the campus before 8:30 A.M. and after 4:30 P.M. or from 12:30 to 1:00 P.M., students desiring the services of a physician will call UN-5842, the Physicians and Surgeons Bureau, who on receipt of the call will arrange for the services of a competent physician to attend the case. The student requesting the call will pay the attending physician.

**Periodic Health Examination.** It is proposed to offer to the Seniors for the present academic year the privilege of undergoing a health examination. The examination is to be conducted along the lines approved by the American Medical Association and will be made without cost to the student. Such an examination is of the utmost importance for the purpose of removing a present disability or forestalling one that may occur in the future.

In young adults, physical defects which may be readily overcome often progress and become in later year a serious handicap that cannot be corrected. The student who graduates ought to be a distinct asset to the State. It is for this purpose that the "Periodic Health Examination" has been inaugurated.

**Emergency Service on the Campus.** During office hours, in the event of an Emergency or Accident of such a nature that the patient is unable to come to the Student Medical Service Office, call Campus 461. A physician will immediately respond to the call.

## ADMISSION

### METHOD OF ADMISSION

The admission of students is in charge of the University Entrance Board, which determines the credits that shall be issued on all entrance examinations and certificates. Correspondence relative to admission should be addressed to the University Examiner, Ohio State University, Columbus.

### ENTRANCE BY DIPLOMA OR EQUIVALENTS

The following persons are eligible to admission without examinations or conditions:

- (1) The holder of a diploma from a first-class high school in the State of Ohio.
- (2) The holder of a properly endorsed certificate from such secondary schools as have been accredited or recognized by the University.
- (3) The holder of a 60 count Regents' Certificate of the State of New York.
- (4) The holder of 15 credit units as determined by the Entrance Board.

### DISTRIBUTION OF UNITS

Of these fifteen units, not less than three shall be in English; one in American history and civics; one in algebra; one in geometry; four in foreign language; one in physics or chemistry; one in botany, zoology, or physiology; and three shall be elective.

### ENTRANCE BY EXAMINATION

Deficiencies in requirements for entrance may be removed by examinations given by the University during the months of September and June.

Students over twenty-one years of age may be admitted upon satisfactory evidence that they can successfully pursue the work elected. No degree will be granted unless the full entrance requirements have been fulfilled.

For further information, see the Bulletin of General Information, which may be obtained on application to the University Examiner.

It is urged that students who desire to enter the University put themselves in communication with the University Examiner at as early a date as possible.



# REGISTRATION

## FRESHMAN WEEK

All Freshmen are required to be present at the University for a special Freshman Program which precedes the opening of the University. This program will begin on Wednesday night, September 25 and continue through the following Monday, September 30. This session is known as Freshman Week.

During this period Freshmen will become familiar with the Campus. They will be given needed information on the history and traditions of the University, as well as definite information on student activities and eligibility requirements. There will be lectures and discussions of vital importance to any student beginning his college career, including instructions on how to study and talks on the care of health.

Intelligence tests, physical examinations, and placement tests are also a part of the Freshman Week Program.

The program of Freshman Week is planned to give students, new to the Campus, an opportunity to adjust themselves to new conditions before the regular routine of class-room work begins.

*Freshmen must be present on the opening date, September 25, for the first meeting on that evening. A penalty of \$5.00 for each day of absence will be imposed. This is the usual penalty for late registration. The exercises of Freshman Week will be of the greatest benefit to the Freshmen and attendance upon them is required. All cases of failure to appear on this day or to be present at any of the exercises of Freshman Week will be reported to the President for action.*

All Freshmen are urged to complete their registration and pay their fees before September 25, in order that they may be free to participate in the program of Freshman Week.

## REGISTRATION

Under the Quarter plan each student will present his program of studies for only one Quarter at a time. During each Quarter certain days will be announced during which every student in residence will be required to file his program of studies for the following Quarter. Fees may be paid as soon as fee cards have been received by the student from the Registrar. Students who have registered sufficiently early usually receive fee cards approximately three weeks prior to the opening of the Quarter. *It is to the advantage of all students to register as early as possible.*

### TIME OF REGISTRATION

All undergraduate students are expected to register and pay their fees *before* the day designated in the University Calendar for classes to begin and to report promptly to their classes on the first day that classes are scheduled.

Applicants presenting themselves after the opening of the Quarter can be admitted only for exceptional reasons and by action of the Execu-

tive Committee. In general, a student who is permitted to enter after the close of the first week of a Quarter will be given a schedule diminished by one full course below the normal requirement for that student.

#### PAYMENT OF FEES

All fees and laboratory deposits required of a student must be paid to the Bursar before the student will be admitted to his classes.

#### PROCEDURE FOR REGISTRATION

NEW STUDENTS.—Registration consists of the following steps in the order indicated. *Unless the student follows these instructions in every detail his registration in the University is not complete.*

(1) The student should secure:

(a) An admission card from the University Examiner. (For necessary entrance credentials see Requirements for Admission, page 9.)

(b) An election card or study-program card from the Professor of Applied Optics. This card must be approved by the Professor of Applied Optics and also by the Schedule Committee.

(c) A fee card from the Registrar's Office. On this card the student will be assessed all incidental, tuition, and laboratory fees. This fee card must be presented to the Bursar when the student pays his fees. All fees must be paid before the student will be admitted to classes. *Students should not attempt to pay fees without a fee card as this will only delay registration.*

(d) A University directory card from the Registrar's Office. Each year upon entering the University every student is required to file in writing, in the Office of the Registrar, his local address and his home address on the blank provided for this purpose. He must report promptly to the Registrar's Office all subsequent changes in either address, as long as he is connected with the University.

(2) Every Freshman must report for a Physical Examination upon the dates appointed in the Freshman Week Program. Entering students other than Freshmen must report for a Physical Examination upon the date of appointment as assigned by the Department of Physical Education. A penalty of \$1.00 will be assessed for failure to keep appointment for Physical Examination or for change in date of Physical Examination.

Men should report to the Medical Examiner for Men, at the Men's Gymnasium.

Women should report to the Medical Examiner for Women, at Pomereene Hall.

(3) Every new student entering the University is required to take an Intelligence Test under the direction of the Department of Psychology, upon the dates appointed in the Freshman Week Program or on the date announced in the University Calendar. (See page 3.)

(4) Every woman student must register with the Dean of Women at her office in Pomerene Hall during the first week of each Quarter. Registration closes Saturday at 12 noon. A penalty of \$5.00 will be assessed for failure to comply with this rule. (See page 16.)

**STUDENTS IN CONTINUOUS RESIDENCE.**—Students who have been in continuous residence in the University will proceed as follows. They should secure:

(1) An election card or study-program card from the Professor of Applied Optics. This card must be approved by the Professor of Applied Optics and also by the Schedule Committee.

(2) A fee card from the Registrar's Office, on which will be assessed all incidental, tuition, and laboratory fees. This card must be presented at the Bursar's Office and all fees paid before the student will be admitted to classes.

(3) Every woman student must register with the Dean of Women at her office in Pomerene Hall during the first week of each Quarter. Registration closes Saturday at 12 noon. A penalty of \$5.00 will be assessed for failure to comply with this rule. (See page 16.)

**FORMER STUDENTS.**—A former student who has not been in continuous residence during the preceding year or was not in residence during the preceding Quarter should go at once to the Office of the Professor of Applied Optics for approval of his re-admission. He then follows the same procedure as a student in continuous residence.

**STUDENTS TRANSFERRING TO ANOTHER COLLEGE IN THE UNIVERSITY.**—A student who desires to transfer from the Department of Applied Optics to any college of this University must make his application for such transfer to the University Examiner. This transfer must be approved by the University Examiner before the student will be permitted to proceed with his registration in the college which he is proposing to enter.



## FEES AND EXPENSES

### GENERAL CHARGES

*All University fees must be paid at the opening of each Quarter as a condition of admission to classes. All registration fees, including laboratory deposits, are assessed in the Office of the Registrar and are paid in the Office of the Bursar. Registration is not complete until all fees have been paid. No student will have any privileges in the classes or laboratories until all fees and deposits are paid.*

*Since all fees are due and payable as a part of the student's registration, no person should come to the University for registration without money sufficient to cover all of his fees and deposits.*

### MATRICULATION FEE

Every student upon his first admission to the University is required to pay a matriculation fee of \$10.00 (non-returnable). This fee is paid but once, and is in addition to other University fees, and entitles the student to the privileges of membership in the University.

### NON-RESIDENT FEE

Every student who is not a legal resident of the State of Ohio is required to pay a non-resident fee of \$35.00 each Quarter of his residence in the University in addition to other University fees. The burden of registering under proper residence is placed upon the student. If there is any possible question of his right to legal residence, the matter should be brought to the attention of the Registrar and passed upon, previous to registration or the payment of fees. Any student who registers improperly under this rule shall be required to pay not only the non-resident fee, but shall be assessed a penalty of \$10.00. Students who do not pay this fee within thirty days after they have been notified that the non-resident fee has been assessed against them, will have their registration in the University cancelled.

No person shall be considered eligible to register in the University as a resident of the State of Ohio unless he has been a bona fide resident in the State twelve consecutive months next preceding the date of his original enrollment; and no person shall be considered to have gained or lost a residence in this State for the purpose of registering in the University by any conduct of his own while he is a student in the University; but persons whose legal residence follows that of other persons, as hereinafter provided, shall be considered to have gained or lost legal residence in this State for such purpose while students in the University according to changes of legal residence of such other persons, except that such legal residence shall not be considered to be so gained until twelve months after such other person becomes a legal resident of this State.



The residence of minors shall follow that of the legal guardian, regardless of emancipation but in case a resident of Ohio is appointed guardian of a non-resident minor, the legal residence of such minor for the purpose of this rule shall not be considered to be established in the State of Ohio until the expiration of twelve months after such appointment.

The residence of wives shall follow that of husbands.

Aliens who have taken out first citizenship papers and who have been residents of Ohio for twelve months next preceding the date of their enrollment in the University, shall be regarded as eligible for registration as residents of Ohio.

#### INCIDENTAL FEE

**First and Second Years.** The tuition fee is \$20.00 each Quarter.

**Third and Fourth Years.** The fee is \$35.00 each Quarter. The total fees for the four years aggregate \$330.00.

**Special Students** or others who take the courses of the third and fourth years, or any portion thereof, shall pay a fee of \$35.00 each Quarter.

#### THE OHIO UNION AND THE WOMEN'S UNION

A fee of \$1.00 each Quarter is paid by all students at registration. This entitles the student to all the privileges of the Unions consistent with the Constitutions and House Rules governing them.

#### STUDENT ACTIVITIES AND MEDICAL SERVICE FEE

All students are required to pay a fee of \$1.00 each Quarter, to be used in support of Student Government activities and the Student Medical Service.

#### LABORATORY DEPOSIT

Students are required to pay for all materials consumed in laboratory work. To meet the cost of these materials a deposit ranging from \$1.00 to \$20.00 for each course requiring such supplies is made at the time of registration before the student may enter the laboratory. All laboratory supplies are sold at the Laboratory Supply Store, Chemistry Building, to students, at cost to the University, and charged against the deposit. (See page 15.)

Instructors shall not permit students to engage in laboratory work unless first shown a receipt from the Bursar for deposits paid.

#### TEXTBOOKS

**Textbooks.** Students should not purchase textbooks until they are advised by the instructors of their respective classes.

#### ROOM AND BOARD

Furnished rooms can be obtained at prices varying from \$10.00 to \$15.00 a month. Board at the restaurants and boarding clubs near the University costs from \$6.00 to \$8.00 a week. Board, with furnished rooms, can be obtained in private families at rates varying around \$10.00 a week. Board can be secured at the Ohio Union at reasonable rates.

## GRADUATION FEE

A fee of \$5.00 to cover expense of graduation and diploma, is required of each person receiving one of the bachelor degrees from the University. This fee must be paid thirty days *before* the close of the Quarter in which the candidate expects to receive his degree. A penalty of \$5.00 will be assessed for failure to comply with this rule. (See page 17.)

## FEES FOR INSTRUCTORS, GRADUATE ASSISTANTS, FELLOWS, AND SCHOLARS

The following persons shall be exempt from all fees except a diploma fee of \$10.00, and a matriculation fee of \$10.00 (unless the latter fee has already been paid as an undergraduate fee), and the exemption shall include laboratory supplies, *but this exemption shall not apply unless the registration is completed within two weeks after the opening of the Quarter:*

(1) All members of the instructional force of the University, including Graduate Assistants, who are registered in the Graduate School of the University.

(2) All persons appointed Fellows or Scholars by the Board of Trustees and registered in the Graduate School.

(3) All instructors registered as students in any College of the University who have obtained their baccalaureate degree.

## CREDIT HOURS FOR INSTRUCTORS

The number of credit hours that may be taken by any graduate student who is not devoting his full time to the work (such as graduate assistants, part-time assistants, teachers in various schools and colleges, etc.) will be decided in each individual case by the Dean of the Graduate School and the student's adviser.

## REFUND ON FEES

Fees are not returnable except in case of sickness and for causes entirely beyond the control of the student. No part of the fees shall be returned for voluntary withdrawal of the student or enforced withdrawal thirty days after the registration. Students withdrawing under discipline forfeit all rights to the return of any part of the fees. No fees will be returned in case of withdrawal of students until thirty days have elapsed from the date of withdrawal.

**On Tuition Fees.** To be entitled to a return of fees, the student must withdraw during the first thirty days of the Quarter and must present the permission to withdraw, given by the Dean, to the Bursar within this thirty day period. Unless the case is entirely exceptional, no more than one-half of the fee paid will be refunded.

**On Laboratory Deposits.** If a student is forced to withdraw from a laboratory course during a Quarter, he must first secure permission from his Dean.

No portion of a laboratory deposit of \$5.00 or less shall be returned, unless the course is officially dropped by the student within thirty days after the payment of the deposit.

On a laboratory deposit of \$6.00 or more the unexpended part of the deposit is returnable if called for on or before the close of the Spring Quarter of the fiscal year in which the deposit has been made.

An order for refund for the unexpended portion of the deposit may be obtained by applying at the Laboratory Supply Store, Chemistry Building. The unexpended part of the deposit will be paid at the Bursar's Office on presentation of the order for refund.

### SPECIAL FEES—PENALTIES

#### PENALTY FOR ABSENCE DURING FRESHMAN WEEK

*Freshmen must be present on the opening date, September 25, for the first meeting on that evening. A penalty of \$5.00 for each day of absence will be imposed. This is the usual penalty for late registration. The exercises of Freshman Week will be of the greatest benefit to the Freshmen and attendance upon them is required. All cases of failure to appear on this day or to be present at any of the exercises of Freshman Week will be reported to the President for action.*

#### PENALTY FOR LATE PAYMENT OF FEES

All fees must be paid by the close of the day preceding the first day of recitations. A penalty of \$5.00 for every succeeding day or fraction thereof will be assessed for failure to comply with this rule, except in the case of a graduate student or a new student granted late registration by the Executive Committee.

A graduate student, or a new student granted late registration, must pay his fees within twenty-four hours of the date of registration as certified by his Dean or Secretary, or the penalty will be imposed.

#### FEE FOR DUPLICATE FEE RECEIPT

A duplicate receipt for fees will be issued only upon presentation of satisfactory evidence of the loss or destruction of the original. A fee of \$1.00 will be charged for each duplicate receipt.

#### PENALTY FOR FAILURE TO REGISTER WITH THE DEAN OF WOMEN

Every woman student must register with the Dean of Women at her office in Pomerene Hall during the first week of each Quarter. Registration closes Saturday at 12 noon. A penalty of \$5.00 will be assessed for failure to comply with this rule.

#### PENALTY FOR FAILURE TO KEEP APPOINTMENT FOR PHYSICAL EXAMINATION

A fee of \$1.00 will be assessed for failure to keep appointment for Physical Examination or for change in date of Physical Examination.



**PENALTY FOR RE-REGISTRATION**

When checks given for payment of fees are not paid on presentation at bank, registration will be cancelled and receipts given considered null and void. A penalty of \$5.00 will be assessed for re-registration.

**FEE FOR CHANGES IN APPROVED ELECTION CARDS OR SCHEDULES**

No changes will be made in approved election cards or schedule assignments at the request of the student without (1) the consent of the Dean or Secretary, (2) the payment of \$1.00 for each change involved. Unless exceptional reasons can be given, all such changes must be made during the first three days of the Quarter.

**FEE FOR SPECIAL EXAMINATIONS**

A fee of \$2.00 will be charged for each special examination. A student who is unable to take an examination in accordance with the official schedule may obtain permission to take a special examination by complying with the following requirements in the order specified:

(1) Obtain the written consent of the instructor concerned on the blank provided for the purpose.

(2) Obtain the approval of the Dean of the College.

(3) Obtain the endorsement of the Bursar after the payment of the special fee of \$2.00.

Unless there is an imperative reason to the contrary (such as prospective absence during the next Quarter) all special examinations shall be held after the date of the regular examination.

**PENALTY FOR LATE PAYMENT OF GRADUATION FEE**

A special graduation fee is required of each person receiving a diploma from the University. This fee must be paid thirty days *before* the close of the Quarter in which the candidate expects to receive his degree. A penalty of \$5.00 will be assessed for failure to comply with this rule.



## COST OF A YEAR'S WORK

One of the most perplexing questions that confronts a prospective student is what the course is going to cost him a year.

In order to furnish information, we have listed below an estimate of the average payments required by the University for the Freshman year, and have estimated the cost of room and board at a safe price. These two items are sometimes reduced slightly where two students occupy the same room and where boarding clubs are economically managed. Fees to the University are paid at the beginning of each Quarter.

## ESTIMATE OF EXPENSES

Matriculation Fee (non-returnable).....	\$ 10 00
Incidental Fee.....	60 00
Ohio Union.....	3 00
Activities and Medical Fee.....	3 00
Deposits to cover laboratory materials and breakage	30 00
Books .....	50 00
Board—36 weeks at \$7.00 a week.....	252 00
Room Rent, at \$15.00 a month.....	135 00
General Expenses.....	100 00
Total .....	\$643 00

The item of *general expenses* is always subject to the personal habits of the individual and varies according to the degree of economy exercised.

NOTE: In order to meet all the necessary expenses of registration, books, and other expenditures incident to securing a room and board, a student should come prepared to expend from \$125 to \$150 during the first ten days of a Quarter. After that period his board and room rent will constitute the major part of his expenses.

## INFORMATION

For further information as to entrance requirements, etc., address the University Examiner. Correspondence is also invited by Morgan C. Davies, Professor of Applied Optics, who will be in his office (Mendenhall Laboratory, Room 206) from 9 to 10 A.M. daily.

## **RULES AND REGULATIONS**

### **THE MARKING SYSTEM AND POINT SYSTEM**

The grade marks given in the several colleges of the University are: A—Excellent; B—Good; C—Average; D—Poor; E—Failed.

K (credit) shall be used for work credited from other institutions and by the University Examiner only.

A value in "Points" is assigned to each of these grades as follows:

For each hour of A grade, 4 credit points shall be allowed.

For each hour of B grade, 3 credit points shall be allowed.

For each hour of C grade, 2 credit points shall be allowed.

For each hour of D grade, 1 credit point shall be allowed.

For each hour of K grade, 1.8 credit points shall be allowed.

The grade E receives no credit either in hours or points.

The mark E cannot be removed by re-examination. (For removal of failures see page 20.)

### **POINTS REQUIRED FOR GRADUATION**

The number of credit points required for graduation shall amount to not less than 1.8 times the number of credit hours undertaken by the student during his course as shown by his record card.

## **LOW STANDING**

### **DISMISSAL AND PROBATION FOR LOW STANDING**

At the end of each Quarter, the Dean of a College shall dismiss from the University any student who fails to earn at least two-thirds as many points as the number of credit hours for which he is scheduled. He shall place on probation any student not out under the above rule (1) who fails to earn at least five points in excess of the number of credit hours for which he is scheduled; or (2) who fails to pass in at least two-thirds of his work. The period of probation shall extend through one Quarter of residence. No student shall be placed on probation more than twice under penalty of dismissal from the University.

The Executive Committee of a College shall have power to place a student on probation at any time for a definite period when in their judgment his scholastic standing is unsatisfactory. In every case of probation, the Dean of the College shall notify both the student and his parent or guardian.

### **DISMISSAL FOR LOW STANDING AFTER PROBATION**

At the end of a Quarter of Probation, the Dean of a College shall dismiss from the University any student: (1) who fails to earn at least five credit points in excess of the number of credit hours for which he is scheduled; or, (2) who fails to pass in at least two-thirds of his work. Notice of dismissal shall be sent by the Dean to the student and to his parent or guardian.

### DISMISSAL FOR DEFICIENCY IN POINTS

A Dean shall refuse to register in the College he represents any student who has been registered in this University for nine Quarters and has not earned credit points equal to at least 1.7 times the number of hours undertaken during his residence and recorded on his record card. Moreover, a student who is eligible for registration for his tenth Quarter in the University, and who fails to maintain at least the ratio of 1.7 points per credit hour undertaken during any subsequent period of three consecutive Quarters of residence at the University, shall be ineligible for further registration. For good and sufficient reasons this rule may be waived in case of any individual student by a two-thirds vote of the Executive Committee of the College. A student entering the University from another institution will be regarded as though his entire residence had been at this University.

### DISMISSAL BY SPECIAL ACTION

In cases not covered by the foregoing rules, if the preparation, progress, or success of a student in his assigned work is deemed unsatisfactory, the Executive Committee of the College shall have power to dismiss him from the University.

### REMOVAL OF FAILURES

#### FAILURE IN A REQUIRED COURSE

At his first opportunity a student must repeat in class a required course in which he has failed, unless the Executive Committee of the College authorizes a substitute course. In a course continuing through two or more Quarters, a failure in any given Quarter must be removed by successful repetition in class before the student will be admitted to the work of the succeeding Quarter.

#### FAILURE IN AN ELECTIVE COURSE

A failure in an elective course may be removed by repetition in class, and must be so removed before a student will be allowed to proceed in a continued course. On petition, the Executive Committee of the College may excuse a student from repeating an elective course.

### WITHDRAWAL FROM THE UNIVERSITY

A student who desires to withdraw from the University must apply to the Dean of the College for permission to withdraw in good standing. *If the student leaves the University at any time during the Quarter without communicating with the Dean of his College, he will be marked as having failed in all his courses for the Quarter.* If a personal interview is impossible, the Dean must be notified by mail. In order to retain his right to voluntary return, the reasons given for withdrawal must be satisfactory to the Dean, and must be so endorsed at the time the application is filed.

The written permission of the Dean shall be filed with the Registrar at once by the College Secretary that the proper entry may be made upon the University records.

If the permission to withdraw is withheld by the Dean and the student absents himself from the University notwithstanding, he will sacrifice his right to return and can obtain readmission only by petition to the Executive Committee of his College, as in the case of a student who has lost his standing by reason of failures.

No student may withdraw in good standing from the University within two weeks of the beginning of examinations unless he can show that his record to date is satisfactory.

When a student withdraws from the University during a Quarter his parent or guardian shall be notified of the fact by the Secretary of the College.

## ABSENCES

### OCCASIONAL ABSENCES

All occasional absences shall be adjusted with the instructors in whose classes they occur. Each department shall frame its own rules relative to occasional absences, but the Administrative Council shall have power to set aside an unreasonable rule. In no case shall absence be held to excuse a student from making up the work lost.

### EXCESSIVE ABSENCE

If a student is absent from a course to such an extent as to imperil his credit, or is notably irregular in attendance, it shall be the duty of the instructor concerned to report the facts promptly to the Dean of the College in which the student is enrolled, and the Dean shall deal with the matter as a case of discipline.

### ABSENCES BEFORE OR AFTER A MID-QUARTER VACATION

A student absent without excuse from a scheduled hour of work on a day immediately preceding or following a mid-quarter vacation (such as Thanksgiving, Washington's Birthday, Memorial Day, Independence Day) shall have a penalty of three hours (and 5.4 points) added to the requirements for his graduation. It shall be the duty of each instructor to report all such absences to the Dean of the College within five days following the vacation. For legitimate reason the Dean may excuse such absences, and he shall certify to the Registrar the list of all persons upon whom the penalty is to be imposed. The Registrar shall enter the penalty upon the student's record card.

NOTE: The object of this rule is to prohibit the extending of a holiday into a longer vacation. If the holiday falls upon a Friday or Monday, Saturday will not be counted for those students who have no work on that day, nor will the fact that a student has scheduled work on Saturday release him from that work or authorize him to be absent the following Monday. Sunday shall not be counted either as the day before or the day after a holiday.



## GRADUATION

### POINTS REQUIRED FOR GRADUATION

The number of credit points required for graduation shall amount to not less than 1.8 times the number of credit hours undertaken by the student during his course as shown by his record card. (For Point System, see page 19.)

### GRADUATION FEE

A special graduation fee is required of each person receiving a diploma from the University. This fee must be paid thirty days before the close of the Quarter in which the candidate expects to receive his degree. A penalty of \$5.00 will be assessed for failure to comply with this rule.

### COMMENCEMENT—CONVOCATION

A special Convocation or Commencement shall be scheduled at the close of each Quarter for the conferring of degrees upon candidates who have fulfilled all the requirements of their respective courses.

### ATTENDANCE AT CONVOCATION EXERCISES

All candidates for degrees are required to be present at their graduation convocation unless excused by the President. Only those students who are to receive their degrees at a given convocation may appear in the class procession on that occasion or be seated with the graduating class.

# APPLIED OPTICS

## CURRICULUM

### FIRST YEAR

AUTUMN QUARTER	WINTER QUARTER	SPRING QUARTER
Chemistry.....(401 or 411) 5	Chemistry....(402 or 412) 5	Chemistry.....(403 or 413) 5
Elementary or General	Elementary or General	Qualitative Analysis
Zoology.....(401) 5	Zoology.....(402) 5	Bacteriology.....(450) 5
Mathematics.....(421) 5	Mathematics .....(422) 5	English.....(401) 5
College Algebra	Plane Trigonometry	

### SECOND YEAR

Physics.....(411) 5	Physics.....(412) 5	Physics.....(413) 5
General	General	General
Physiology.....(407) 5	Physiology....(408 or 409) 5	Anatomy.....(437) 4
Psychology.....(401) 5	Anatomy.....(414) 5	Eye
Elective..... 3	Elective..... 4	Anatomy.....(640) 7
		Histology and Embryology

### THIRD YEAR

Physics.....(501) 5	Physics.....(502) 5	Physics.....(503) 5
Geometrical and Physical Optics	Geometrical and Physical Optics	Geometrical and Physical Optics
Applied Optics.....(411) 4	Applied Optics.....(412) 4	Applied Optics... (413) 4
Vision Optics	Vision Optics	Vision Optics
Pathology.....(450) 3	Pathology.....(451) 3	Elective..... 8
Psychology.....(402) 5	Elective..... 5	

### FOURTH YEAR

Applied Optics.....(441) 5	Applied Optics.....(442) 5	Applied Optics.....(443) 5
Clinical Laboratory Practice	Clinical Laboratory Practice	Clinical Laboratory Practice
Applied Optics.....(421) 3	Applied Optics.....(422) 3	Applied Optics.....(423) 3
Theoretical Applied Optics	Theoretical Applied Optics	Theoretical Applied Optics
Applied Optics.....(431) 2	Applied Optics.....(432) 2	Applied Optics.... (433) 2
Mechanical Optics	Mechanical Optics	Mechanical Optics
Pathology.....(460) 3	Pathology.....(461) 3	Elective..... 5
Pathology of the Eye	Pathology of the Eye	
Elective..... 3	Elective..... 3	

All electives shall be subject to the approval of the Professor of Applied Optics.

### DEGREE

Upon the satisfactory completion of the curriculum as outlined above, or what is deemed to be its equivalent, the student will be recommended for the degree of Bachelor of Science in Applied Optics.

## DEPARTMENTS OF INSTRUCTION

### ANATOMY

Office, Hamilton Hall

PROFESSOR LANDACRE, ASSISTANT PROFESSOR KNOUFF,  
MR. SETTERFIELD, AND DEPARTMENT ASSISTANTS

414. **Comparative Anatomy of the Vertebrates.** Five credit hours. Winter Quarter. Two lectures and six laboratory hours each week. Applied Optics, second year. Prerequisite, Zoology 401. Mr. Setterfield.

The anatomy of one or more of the higher vertebrates.

Not open to students who have credit for Anatomy 402.

437. **The Eye.** Four credit hours. Spring Quarter. One recitation and six laboratory hours each week. Applied Optics, second year. Prerequisites, Zoology 401-402, and Anatomy 413 or 414. Mr. Setterfield.

The gross anatomy of the orbit and eye in the shark, sheep, and man with the embryology and histology of the organ of vision.

640. **Histology and Embryology.** Seven credit hours. Spring Quarter. Three recitations and twelve laboratory hours each week. Applied Optics, second year. Mr. Knouff and assistants.

The general histology of the tissues and the special histology of the skeletal, vascular, digestive, respiratory, urinary, and nervous systems.

Not open to students who have credit for Anatomy 440.

### APPLIED OPTICS

Office, 206 Mendenhall Laboratory

PROFESSOR DAVIES, MR. ELLIS

411. **Vision Optics.** Four credit hours. Autumn Quarter. Lectures and quiz. Applied Optics, third year. Prerequisites, Zoology 401-402, Anatomy 413 or 414, 437, 440 or 640, Physics 401-402 or 403-404, or 411-412-413, and Mathematics 421-422. Mr. Ellis.

Recitations, lectures, and demonstrations dealing with the principles of refraction in the human eye based on the laws of conjugate foci; hyperopia, myopia, and astigmatism; ophthalmoscopy and the fundamentals of vision.

412. **Vision Optics.** Four credit hours. Winter Quarter. Lectures and quiz. Applied Optics, third year. Prerequisite, Applied Optics 411. Mr. Ellis.

Lectures and demonstrations of clinical methods of refraction, their theory and practical application. The conjugate foci theory of mirror fundus reflexes. Keratometry and other methods of objective and subjective eye examination.

**413. Vision Optics.** Four credit hours. Spring Quarter. Lectures and quiz. Applied Optics, third year. Prerequisite, Applied Optics 412. Mr. Ellis.

Lectures and demonstrations on accommodations, convergence, coordination of the visual functions, retinal images and ocular calculations. Visual field work, ocular calisthenics, heterophoria and squint. Differential determination of ocular abnormalities.

**421. Theoretical Applied Optics.** Three credit hours. Autumn Quarter. Lectures and quiz. Applied Optics, fourth year. Prerequisites, Applied Optics 411-412-413. Dr. Davies.

The etiology, symptoms, and treatment of squint of all varieties. Both concomitant and paralytic squints will be discussed, together with a summary of extra-ocular imbalances.

**422. Theoretical Applied Optics.** Three credit hours. Winter Quarter. Lectures and quiz. Applied Optics, fourth year. Prerequisite, Applied Optics 421. Dr. Davies.

Functions of the retina, theories of color vision, stereoscopic vision, optical illusions.

**423. Theoretical Applied Optics.** Three credit hours. Spring Quarter. Lectures and quiz. Applied Optics, fourth year. Prerequisite, Applied Optics 422. Dr. Davies.

The eye as an optical instrument. Theories of vision, field studies, and abnormalities of vision.

In courses 422-423 the fundamental principles of physiological optics will be thoroughly covered.

**431. Mechanical Optics.** Two credit hours. Autumn Quarter. One lecture and two laboratory hours each week. Applied Optics, fourth year. Prerequisites, Applied Optics 401-402-403, or Physics 501-502-503, and Applied Optics 411-412-413. Mr. Ellis and assistants.

Lens centering, axis marking, use of lens measure. Surface grinding and polishing. Marking rough and semifinished bifocals.

**432. Mechanical Optics.** Two credit hours. Winter Quarter. One lecture and two laboratory hours each week. Applied Optics, fourth year. Prerequisite, Applied Optics 431. Mr. Ellis and assistants.

Lens sizing, cutting, edging, both hand and automatic. A study of systems of spectacle and eye glass mountings. Soldering.

**433. Mechanical Optics.** Two credit hours. Spring Quarter. One lecture and two laboratory hours each week. Applied Optics, fourth year. Prerequisite, Applied Optics 432. Mr. Ellis and assistants.

Face measurements, mounting and adjusting frames. Truing, bridge bending. Prescription writing and reading. Fitting of bifocal lenses.

**441. Clinical Laboratory Practice.** Five credit hours. Autumn Quarter. One conference and five two-hour laboratory periods each week. Applied Optics, fourth year. Prerequisites, Applied Optics 401-402-403, or Physics 501-502-503, and Applied Optics 411-412-413. Mr. Ellis and assistants.



The conference hour will be given to a discussion and study of cases coming up in the practice. Four laboratory periods will be given to making examinations in the clinic laboratory, and one laboratory period to work in the hospital.

**442. Clinical Laboratory Practice.** Five credit hours. Winter Quarter. One conference and five two-hour laboratory periods each week. Applied Optics, fourth year. Prerequisite, Applied Optics 441. Mr. Ellis and assistants.

This course is a continuation of Applied Optics 441.

**443. Clinical Laboratory Practice.** Five credit hours. Spring Quarter. One conference and five two-hour laboratory periods each week. Applied Optics, fourth year. Prerequisite, Applied Optics 442. Mr. Ellis and assistants.

This course is a continuation of Applied Optics 442.

### BACTERIOLOGY

Office, 202 Veterinary Laboratory Building

PROFESSOR MORREY, MR. HELZ, MISS TRACY

**450. Bacteriology.** Five credit hours. Spring Quarter. Two class periods and three three-hour laboratory periods each week. Applied Optics, first year. Mr. Morrey, Miss Tracy, Mr. Helz.

The study of bacteria with reference to morphology, staining growth on culture media, effect of physical and chemical environment, action on their food material. Principles of disinfection and sterilization. Some of the pathogenic organisms of the mouth cavity and of the eye are studied.

### CHEMISTRY

Office, 108 Chemistry Building

General Chemistry Office, 112 Chemistry Building

PROFESSOR EVANS, ASSOCIATE PROFESSOR DAY, MR. FERNELIUS,  
AND DEPARTMENT ASSISTANTS

**401. Elementary Chemistry.** Five credit hours. One Quarter. Autumn and Winter. One lecture, one recitation, and six laboratory hours each week. This course or 411 required in Applied Optics, first year. Mr. Evans, Mr. Day, Mr. Fernelius, and assistants.

A general course in the chemistry of the non-metals. To be followed by Chemistry 402.

This course is not open to students who have entrance credit for chemistry.

**402. Elementary Chemistry.** Five credit hours. One Quarter. Winter and Spring. One lecture, one recitation, and six laboratory hours each week. This course or 412 required in Applied Optics, first year. Prerequisite, Chemistry 401. Mr. Evans, Mr. Day, Mr. Fernelius and assistants.

A continuation of the study of the non-metals and a survey of the chemistry of the metals. To be followed by Chemistry 403.

This course is not open to students who have entrance credit for chemistry.

**403. Qualitative Analysis.** Five credit hours. Spring Quarter. One lecture, one recitation, and six laboratory hours each week. This course or 413 required in Applied Optics, first year. Prerequisite, Chemistry 402. Mr. Evans, Mr. Day, Mr. Fernelius and assistants.

A brief course in the systematic detection and separation of the metals and acids.

This course is not open to students who have entrance credit for chemistry.

**411. General Chemistry.** Five credit hours. One Quarter. Autumn and Winter. One lecture, one recitation, and six laboratory hours each week. This course or 401 required in Applied Optics, first year. Prerequisite, an acceptable course in high-school chemistry. Mr. Evans, Mr. Day, Mr. Fernelius and assistants.

A general course in the chemistry of the non-metals, more advanced than Chemistry 401. To be followed by Chemistry 412.

**412. General Chemistry.** Five credit hours. One Quarter. Winter and Spring. One lecture, one recitation, and six laboratory hours each week. This course or 402 required in Applied Optics, first year. Prerequisite, Chemistry 411. Mr. Evans, Mr. Day, Mr. Fernelius and assistants.

A continuation of Chemistry 411, including the chemistry of the metals. To be followed by Chemistry 413.

**413. Qualitative Analysis.** Five credit hours. Spring Quarter. One lecture, one recitation, and six laboratory hours each week. This course or 403 required in Applied Optics, first year. Prerequisite, Chemistry 412. Mr. Evans, Mr. Day, Mr. Fernelius and assistants.

A general course in qualitative analysis, dealing with the systematic separation and identification of the metals and acids. It also includes the application of the ionization theory, mass action law, and the principles of chemical equilibrium to qualitative analysis.

## ENGLISH

Office, 103 Mendenhall Laboratory  
PROFESSORS DENNEY AND BECK, DEPARTMENT INSTRUCTORS  
AND ASSISTANTS

**401. Composition and Reading.** Five credit hours. One Quarter. Autumn, Winter, Spring. Five hours of recitation, quiz, reading, and practice each week. Applied Optics, first year. No prerequisite. Director, Mr. Beck.

A special examination for advanced credit in English 401 is given during Freshman Week.

## MATHEMATICS

Offices, 307, 314, 315, and 317 University Hall  
 PROFESSORS KUHN, RASOR, AND ARNOLD, DEPARTMENT  
 INSTRUCTORS AND ASSISTANTS

**421. College Algebra.** Five credit hours. One Quarter. Autumn and Winter. Five recitations each week. Applied Optics, first year. Prerequisites, one unit of entrance algebra and one unit of entrance geometry. All instructors.

Fundamental ideas and topics of college algebra. Designed, along with the allied courses, Mathematics 422, 429, 435, to give students in the arts and sciences a conception of the character and possibilities of modern mathematics, especially in relation to its uses in other subjects.

**422. Plane Trigonometry.** Five credit hours. One Quarter. Winter and Spring. Five recitations each week. Applied Optics, first year. Prerequisites, one unit of entrance algebra and one unit of entrance geometry. All instructors.

Solution of right and oblique triangles, theory and use of logarithms, solution of trigonometric equations and identities, various applications to the arts and sciences.

**423. Analytic Geometry.** Five credit hours. Spring Quarter. Five recitations each week. Elective. Prerequisites, Mathematics 421, 422. All instructors.

NOTE: Students who have one and one-half units of mathematics for entrance to the University may elect Mathematics 431-432-433 in place of 421-422-423.

## PATHOLOGY

Office, Hamilton Hall  
 PROFESSOR SCOTT, DR. REINHART

**450. Pathology.** Three credit hours. Autumn Quarter. One lecture and six laboratory hours each week. Applied Optics, third year. Prerequisites, Zoology 401-402, Anatomy 413 or 414, 437, and 440 or 640, Dr. Reinhart.

General pathology, including the etiology of diseases, disturbances of nutrition, inflammation, and tumors.

**451. Pathology.** Three credit hours. Winter Quarter. One lecture and six laboratory hours each week. Applied Optics, third year. Prerequisite, Pathology 450. Dr. Reinhart.

This course is a continuation of Pathology 450.

**460. Pathology of the Eye.** Three credit hours. Autumn Quarter. Lectures and recitations. Applied Optics, fourth year. Prerequisites, Pathology 450, 451. Mr. Frost.

The gross and histological lesions involving the eye.

**461. Pathology of the Eye.** Three credit hours. Winter Quarter. Lectures, recitations, and laboratory. Applied Optics, fourth year. Prerequisite, Pathology 460. Mr. Frost.

This course is a continuation of Pathology 460.

**PHYSICS**

Office, 107 Mendenhall Laboratory

PROFESSOR ALPHEUS W. SMITH, ASSISTANT PROFESSOR ALVA W. SMITH,  
MR. KNAUSS, MR. POOL, MR. GREEN, AND DEPARTMENT ASSISTANTS

**411. General Physics: Mechanics.** Five credit hours. One Quarter. Autumn and Winter. Four lectures and recitations and one two-hour laboratory period each week. Applied Optics, second year. Prerequisite, two entrance units in mathematics. Mr. Alpheus Smith, Mr. Alva Smith, Mr. Knauss, Mr. Green.

This course is not open to students who have credit for Physics 401 or 403.

**412. General Physics: Heat, Sound, Light.** Five credit hours. Winter Quarter. Four lectures and recitations and one two-hour laboratory period each week. Applied Optics, second year. Prerequisite, Physics 411. Mr. Alpheus Smith, Mr. Alva Smith, Mr. Knauss, Mr. Green.

This course is not open to students who have credit for Physics 402 or 404.

**413. General Physics: Electricity.** Five credit hours. Spring Quarter. Four lectures and recitations and one two-hour laboratory period each week. Applied Optics, second year. Prerequisite, Physics, 411. Mr. Alpheus Smith, Mr. Alva Smith, Mr. Knauss, Mr. Green.

This course is not open to students who have credit for Physics 405.

**501. Geometrical and Physical Optics.** Five credit hours. Autumn Quarter. Three lectures and recitations and two two-hour laboratory periods each week. Applied Optics, third year. Prerequisites, Physics 411-412-413, or Physics 403-404, and Mathematics 421-422. Mr. Pool.

This course treats of the fundamental principles and methods of geometrical optics, with special reference to refractive indices, prisms, thin lenses, cylindrical lenses, combinations of thin lenses and thin lens systems, etc.

Not open to students who have credit for Applied Optics 401.

**502. Geometrical and Physical Optics.** Five credit hours. Winter Quarter. Three lectures and recitations and two two-hour laboratory periods each week. Applied Optics, third year. Prerequisite, Physics 501. Mr. Pool.

A continuation of Physics 501. It treats of thick lenses, combinations of lenses and mirrors, optical instruments used in conjunction with the eye, magnifying power, chromatic and spherical aberration, diffraction, interference, etc.

Not open to students who have credit for Applied Optics 402.

**503. Geometrical and Physical Optics.** Five credit hours. Spring Quarter. Three lectures and recitations and two two-hour laboratory periods each week. Applied Optics, third year. Prerequisite, Physics 501. Mr. Pool.

A continuation of Physics 501. It treats of optical instruments, spectroscopy, photometry and illumination, double refraction polarization, absorption of light, color vision, etc.

Not open to students who have credit for Applied Optics 403.



**PHYSIOLOGY**

Office, Hamilton Hall

PROFESSORS SEYMOUR AND BLEILE, ASSISTANT PROFESSORS E. P. DURRANT AND HITCHCOCK, MR. HAMLIN, AND DEPARTMENT ASSISTANTS

**407. Elementary Physiology.** Five credit hours. One Quarter. Autumn and Winter. Three hours of lectures or recitations and four hours of laboratory each week. Applied Optics, second year. Prerequisite, one Quarter of chemistry or one unit of high-school chemistry. Not open to Freshmen. Mr. Seymour, Mr. Bleile, Mr. E. P. Durrant, Mr. Hitchcock, Mr. Hamlin, and assistants.

A foundation course in the fundamental principles of animal physiology, including the chemical and physical structure of animal matter; the reactions involved in animals, including the human body in responding to environmental conditions; the formation, structure, and functions of blood and lymph; and the fundamental structure of the nervous system with particular emphasis on reflex actions. A survey of the conditions determining the activities of living forms.

This course is not open to students who have credit for any course in physiology.

**408. Elementary Physiology.** Five credit hours. One Quarter. Winter and Spring. Three hours of lectures or recitations and four hours of laboratory each week. Prerequisite, Physiology 407. Not open to Freshmen. Mr. Seymour, Mr. Bleile, Mr. E. P. Durrant, Mr. Hitchcock, Mr. Hamlin, and assistants.

Either this course or Physiology 409 may be chosen by the student as a continuation of Physiology 407, or this course may follow Physiology 409 if the student so elects. This course presents the elementary study of respiration, foods, digestion, metabolism, and excretion.

Not open to students who have credit for Physiology 404.

**409. Elementary Physiology.** Five credit hours. One Quarter. Winter and Spring. Three hours of lectures or recitations and four hours of laboratory each week. Prerequisite, Physiology 407. Not open to Freshmen. Mr. Seymour, Mr. Bleile, Mr. E. P. Durrant, Mr. Hitchcock, Mr. Hamlin, and assistants.

Either this course or Physiology 408 may be chosen as the continuation of Physiology 407. This course may precede or follow Physiology 408. An elementary study of circulation, the organs of internal secretion, the central nervous system, and the special senses.

Not open to students who have credit for Physiology 404.

**PSYCHOLOGY**

Office, 325 Education Building

PROFESSORS ARPS AND WEISS, ASSOCIATE PROFESSORS WILSON AND  
RENSHAW, DEPARTMENT INSTRUCTORS AND ASSISTANTS

**401. Elementary Psychology.** Five credit hours. One Quarter. Autumn, Winter, Spring. Five lecture hours each week. Lectures and recitations. Applied Optics, second year. All instructors.

**402. Elementary Psychology.** Five credit hours. One Quarter. Autumn, Winter, Spring. Five lecture hours each week. Lectures and recitations. Applied Optics, third year. Prerequisite, Psychology 401. All instructors.

This course is a continuation of Psychology 401.

**FOR ADVANCED UNDERGRADUATES AND GRADUATES**

According to the University regulations, courses in this group are not open to Freshmen and Sophomores.

**601. Experimental Psychology.** Three credit hours. Autumn Quarter. One lecture and two laboratory periods each week. Elective. Prerequisite, Psychology 402. Mr. Renshaw.

This is the fundamental course for General Psychology and is recommended to students expecting to carry on psychological research. The experiments are designed to demonstrate the fundamental laws of human behavior and to develop the technique of handling standard psychological apparatus.

**602. Experimental Psychology.** Three credit hours. Winter Quarter. One lecture and two laboratory periods each week. Elective. Mr. Renshaw.

This course is a continuation of Psychology 601.

**ZOOLOGY**

Office, 101 Botany and Zoology Building

PROFESSORS OSBURN AND KRECKER, ASSISTANT PROFESSOR KOSTIR,  
MR. D. F. MILLER, MR. J. N. MILLER, MR. PRICE, AND  
DEPARTMENT ASSISTANTS

**401-402. General Zoology.** Five credit hours. Two Quarters. Both 401 and 402 are given Autumn, Winter, Spring. Three lectures and two two-hour laboratory periods each week. Applied Optics, first year. Mr. Krecker, Mr. Kostir, Mr. D. F. Miller, Mr. Price, Mr. J. N. Miller, and assistants.

A course intended to give the student a general view of the nature of animal life and to point out its relation to man's economic and social activities. The chief topics considered are as follows: nature and structure of living substance, food and its energy transformations, the essentials of reproduction; a review of the animal groups with special stress on useful and harmful qualities; animal distribution and relation to environment; heredity and evolution with particular stress upon their relation to human affairs.